2019

# Let's put the Kibosh on Cardiovascular Disease

David Viscido
*University of Vermont*

# Let’s put the Kibosh on Cardiovascular Disease (CVD)

Thomas Chittenden Health Center, Williston, VT

David Viscido

Family Medicine: March 2019 – April 2019

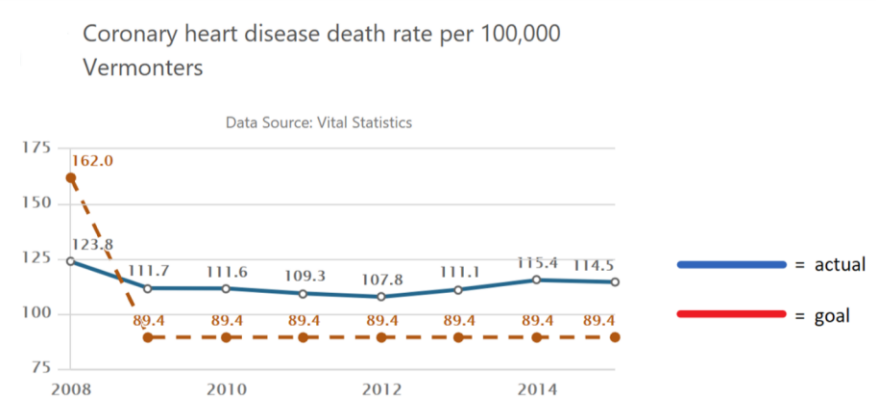
Mentor: Dr. Donnelly

# Problem Identification

- **1 out of every 4 American deaths is due to cardiovascular disease (CVD),** with **coronary heart disease (CHD)** being the most common cause.
- CVD has been the **#1 cause of death in the US for over 80 years!**
- **In 2015, the death rate due to CVD increased for the first time since 1969.**

# Problem Identification (cont.)

- Recent trends in Vermont indicate that **we're not meeting our statewide goal** towards reducing the mortality of CHD.




http://www.healthvermont.gov/scorecard-heart-disease-stroke

- Vermont's death rate due to CHD, in ages >35yo, is **higher than the national average.**

Vermont Summary Statistics

Coronary Heart Disease Death Rate per 100,000, 35+, All Races/Ethnicities, Both Genders, 2014-2016

| Race or Ethnicity | Coronary Heart Disease Death Rate per 100,000 | |
|---|---|---|
| | State | National |
| **All Races/Ethnicities** | 200 | 189.1 |
| **Black (Non-Hispanic)** | Insufficient Data | 220.5 |
| **White (Non-Hispanic)** | 202.4 | 194.5 |
| **Hispanic** | Insufficient Data | 145.6 |
| **American Indian and Alaskan Native** | Insufficient Data | 186.7 |
| **Asian and Pacific Islander** | Insufficient Data | 108.3 |

https://nccd.cdc.gov/DHDSPAtlas/Reports.aspx

# Public Health Cost

- In 2016, the US spent a total of $555 billion (includes lost productivity)
  - The American Heart Association projects that **by 2035, total costs will reach $1.1 trillion.**
  - The greatest contributor to this cost burden is **CHD**.
- Vermont (2015): Total cost per capita of Medicare beneficiaries diagnosed with heart disease: **$12,966 - $17,923**

**Projections – CVD Total Costs Through 2035**

| | Current | 2035 |
|---|---|---|
| Medical costs up 135 percent | $318 billion | $749 billion |
| Indirect costs up 55 percent (Lost productivity) | $237 billion | $368 billion |
| **TOTAL COSTS** | **$555 billion** | **$1.1 trillion** |

| | Current | 2035 |
|---|---|---|
| High Blood Pressure | $68 billion | $154 billion |
| CHD | $89 billion | $215 billion |
| CHF | $18 billion | $45 billion |
| Stroke | $37 billion | $94 billion |
| AFib | $24 billion | $55 billion |
| Other | $83 billion | $187 billion |
| **TOTAL MEDICAL COSTS** | **$318 billion** | **$749 billion** |

https://www.heart.org/-/media/files/get-involved/advocacy/burden-report-consumer-report.pdf?la=en&hash=0A2A75E9FE82F7BEAE6A6A0FDB64E3FCE2BD8669

# What can we do about this?

- Decades of keeping the rate of CVD-related deaths in check were owed to **"vigorous efforts to educate Americans about smoking, diet, and other CHD risk factors,"** with **treatment and prevention each contributing equally to this success** (David S. Jones, 2013).
- "Ominous trends" and "pessimistic narratives" regarding the trajectory of heart disease render the issue seemingly out of our control, but **we can control the most important risk factors of CVD.**
  - Over 50% of mortalities caused by CHD are attributed to **modifiable risk factors** alone (Peter WF Wilson, 2018).

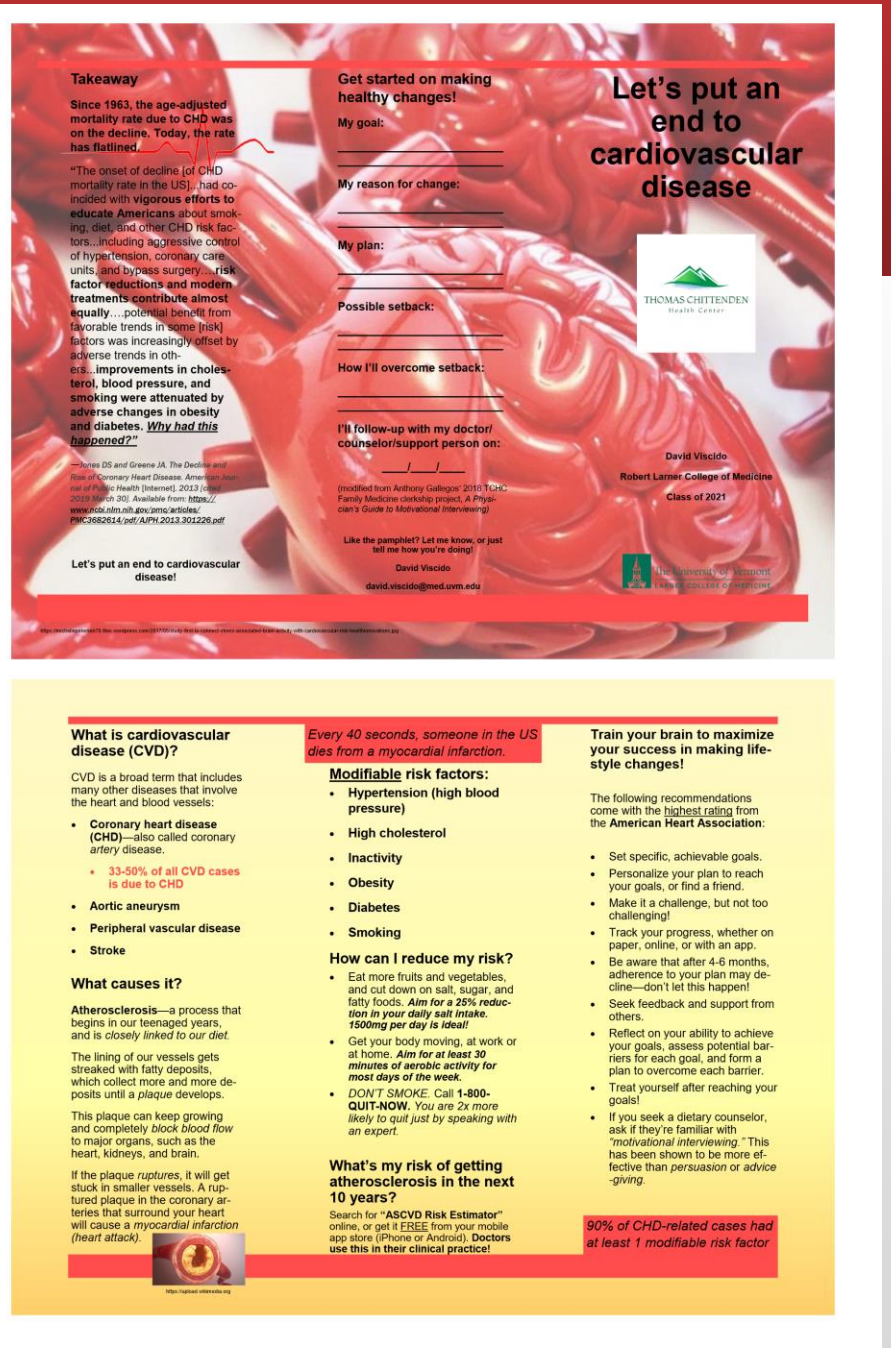
# Community Perspective/Interviews

- *"When I found out from the doctor that I needed triple bypass surgery, I was shocked and in disbelief. I thought I had been doing everything right to prevent this situation—exercising, taking medication, etcetera. I wasn't the best eater, but I wasn't the worst either. I had the surgery at 79 years old. Had I not taken the medications and exercised, and all that stuff, I probably would have had this surgery a lot sooner. My dad died of a heart attack at 53 years old, and my mother had heart disease. My problem was clearly genetic."*–Anonymous patient

- *"Separate from the usual risk factors, I think the stress of lifestyle (that leaves little time for consideration for appropriate exercise and diet) inhibits most people from having time and effort to make better choices....I think the best approach is to initially, strongly make the point about risk factor change - and then to thereafter be consistent in reminding patients even gently with humor at each visit, if possible....Aside from getting old, I think most spend more time outdoors, even in spite of the weather challenge, which I think is healthy."*—Dr. Joe Haddock

# Intervention/Methodology

- The aim of the project was to increase patient awareness of CVD.
- Provide an easy-to-read pamphlet for adult patients, outlining the basics of CVD and modifiable risk factors
- The intention was to combine key concepts from prior clerkship projects that were completed at TCHC, with the hope of continuing **hypertension awareness** and **motivational interviewing**, both for the sake of public health and quality improvement.



**Takeaway**

**Since 1963, the age-adjusted mortality rate due to CHD was on the decline. Today, the rate has flatlined.**

"The onset of decline [of CHD mortality rate in the US]...had coincided with **vigorous efforts to educate Americans** about smoking, diet, and other CHD risk factors...including aggressive control of hypertension, coronary care units, and bypass surgery....**risk factor reductions and modern treatments contribute almost equally**....potential benefit from favorable trends in some [risk] factors was increasingly offset by adverse trends in others...**improvements in cholesterol, blood pressure, and smoking were attenuated by adverse changes in obesity and diabetes. *Why had this happened?"***

—Jones DS and Greene JA. *The Decline and Rise of Coronary Heart Disease. American Journal of Public Health* [Internet]. 2013 [cited 2019 March 30]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3682614/pdf/AJPH.2013.301226.pdf

**Let's put an end to cardiovascular disease!**

**Get started on making healthy changes!**

**My goal:**

**My reason for change:**

**My plan:**

**Possible setback:**

**How I'll overcome setback:**

**I'll follow-up with my doctor/ counselor/support person on:**

___/___/___

(modified from Anthony Gallegos' 2018 TCHC Family Medicine clerkship project, *A Physician's Guide to Motivational Interviewing*)

**Like the pamphlet? Let me know, or just tell me how you're doing!**

**David Viscido**

**david.viscido@med.uvm.edu**

**Let's put an end to cardiovascular disease**

THOMAS CHITTENDEN Health Center

**David Viscido**

**Robert Larner College of Medicine**

**Class of 2021**

The University of Vermont Larner College of Medicine

**What is cardiovascular disease (CVD)?**

CVD is a broad term that includes many other diseases that involve the heart and blood vessels:

- **Coronary heart disease (CHD)**—also called coronary *artery* disease.
  - **33-50% of all CVD cases is due to CHD**
- **Aortic aneurysm**
- **Peripheral vascular disease**
- **Stroke**

**What causes it?**

**Atherosclerosis**—a process that begins in our teenaged years, and is *closely linked to our diet.*

The lining of our vessels gets streaked with fatty deposits, which collect more and more deposits until a *plaque* develops.

This plaque can keep growing and completely *block blood flow* to major organs, such as the heart, kidneys, and brain.

If the plaque *ruptures*, it will get stuck in smaller vessels. A ruptured plaque in the coronary arteries that surround your heart will cause a *myocardial infarction (heart attack).*

*Every 40 seconds, someone in the US dies from a myocardial infarction.*

**Modifiable risk factors:**

- **Hypertension (high blood pressure)**
- **High cholesterol**
- **Inactivity**
- **Obesity**
- **Diabetes**
- **Smoking**

**How can I reduce my risk?**

- Eat more fruits and vegetables, and cut down on salt, sugar, and fatty foods. ***Aim for a 25% reduction in your daily salt intake. 1500mg per day is ideal!***
- Get your body moving, at work or at home. ***Aim for at least 30 minutes of aerobic activity for most days of the week.***
- *DON'T SMOKE.* Call **1-800-QUIT-NOW.** *You are 2x more likely to quit just by speaking with an expert.*

**What's my risk of getting atherosclerosis in the next 10 years?**

Search for **"ASCVD Risk Estimator"** online, or get it FREE from your mobile app store (iPhone or Android). **Doctors use this in their clinical practice!**

**Train your brain to maximize your success in making lifestyle changes!**

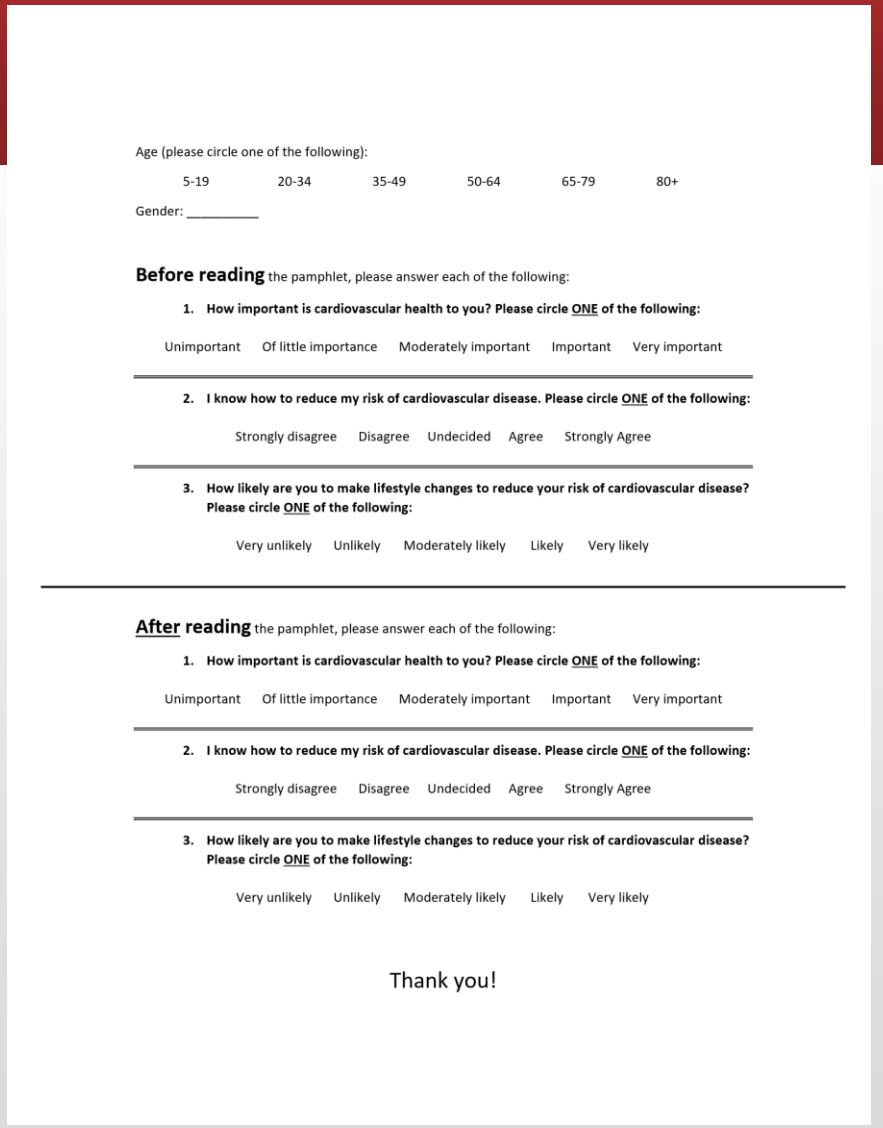
The following recommendations come with the highest rating from the **American Heart Association**:

- Set specific, achievable goals.
- Personalize your plan to reach your goals, or find a friend.
- Make it a challenge, but not too challenging!
- Track your progress, whether on paper, online, or with an app.
- Be aware that after 4-6 months, adherence to your plan may decline—don't let this happen!
- Seek feedback and support from others.
- Reflect on your ability to achieve your goals, assess potential barriers for each goal, and form a plan to overcome each barrier.
- Treat yourself after reaching your goals!
- If you seek a dietary counselor, ask if they're familiar with *"motivational interviewing."* This has been shown to be more effective than *persuasion* or *advice-giving.*

*90% of CHD-related cases had at least 1 modifiable risk factor*

# Intervention/Methodology (cont.)

- Informational brochures were left at the receptionists' desks, accompanied by a brief "before" and "after" survey for patients to fill out while they waited.
- The survey was used to assess the effectiveness of the brochure—How important is cardiovascular health to readers? Are they knowledgeable about certain modifiable risk factors? How likely are they to make healthy lifestyle changes?



Age (please circle one of the following):

5-19 20-34 35-49 50-64 65-79 80+

Gender: _____

**Before reading** the pamphlet, please answer each of the following:

1. **How important is cardiovascular health to you? Please circle ONE of the following:**

   Unimportant Of little importance Moderately important Important Very important

2. **I know how to reduce my risk of cardiovascular disease. Please circle ONE of the following:**

   Strongly disagree Disagree Undecided Agree Strongly Agree

3. **How likely are you to make lifestyle changes to reduce your risk of cardiovascular disease? Please circle ONE of the following:**

   Very unlikely Unlikely Moderately likely Likely Very likely

**After reading** the pamphlet, please answer each of the following:

1. **How important is cardiovascular health to you? Please circle ONE of the following:**

   Unimportant Of little importance Moderately important Important Very important

2. **I know how to reduce my risk of cardiovascular disease. Please circle ONE of the following:**

   Strongly disagree Disagree Undecided Agree Strongly Agree

3. **How likely are you to make lifestyle changes to reduce your risk of cardiovascular disease? Please circle ONE of the following:**

   Very unlikely Unlikely Moderately likely Likely Very likely

Thank you!

# Results/Response Data

- Favorable responses were observed for each of the three questions that were asked in the survey "after" participants read the brochure (Table 1).
- There was a significant difference "before" and "after" participants read the brochure ($p<0.05$) (Table 2).

| *How important is cardiovascular health to you?* | Before | After |
|---|---|---|
| *Unimportant* | 0% | 0% |
| *Of little importance* | 4% | 1% |
| *Moderately important* | 22% | 9% |
| *Important* | 31% | 38% |
| *Very important* | 43% | 51% |
| | | |
| *I know how to reduce my risk of cardiovascular disease.* | Before | After |
| *Strongly disagree* | 4% | 1% |
| *Disagree* | 3% | 0% |
| *Undecided* | 15% | 4% |
| *Agree* | 56% | 56% |
| *Strongly agree* | 22% | 38% |
| | | |
| *How likely are you to make lifestyle changes to reduce your risk of cardiovascular disease?* | Before | After |
| *Very unlikely* | 0% | 0% |
| *Unlikely* | 1% | 0% |
| *Moderately likely* | 31% | 21% |
| *Likely* | 37% | 37% |
| *Very likely* | 31% | 43% |

**Table 1.** Survey responses represented as a proportion of respondents (N=68), rounded to the nearest whole percent.

**Test Statistics[a]**

| | before_importance - after_importance | before_knowledge - after_knowledge | before_likelytochange - after_likelytochange |
|---|---|---|---|
| Z | -3.626[b] | -3.868[b] | -3.690[b] |
| Asymp. Sig. (2-tailed) | .000 | .000 | .000 |

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

**Table 2.** Wilcoxon Signed-Rank Test was used to compare "before" and "after" responses for each of the three questions that were asked in the survey (coded in SPSS as "importance," "knowledge," and "likelytochange," respectively). "Asymp. Sig. (2-tailed)" value is the *p*-value for the test.

# Effectiveness and Limitations

- The brochure received **high marks for quality, accessibility, and creativity** by members of the TCHC team.
- A total of **70 surveys were filled out,** 68 were completed. Only completed surveys were analyzed for statistical significance.
- Limitations:
  - In general, brochures fall short of individualizing patients' understanding and degree of risk of cardiovascular disease.
  - Did not survey patients outside of TCHC
  - Did not distribute brochure outside of TCHC.
  - There was a disproportionately higher number of female respondents (65%) compared to males (26%); *8% of respondents did not remark on their gender.*

# Future Directions

- Continue to distribute the brochure–as a means of maintaining awareness of cardiovascular health–and collect surveys at TCHC; and distribute the brochure to other clinics as well.
- Keep track of how many patients (1) picked up a brochure (2) took brochure home with them, and (3) filled out the back portion of the survey and/or followed through with their lifestyle goals per brochure “instructions.”
- Follow-up with patients who had filled out and/or took the brochure home with them to see if the information provided in the brochure had a lasting impact.
- Collaborate with multidisciplinary specialists–nutritionists and cardiologists–to expand the scope of the project.

# References


1. Jones DS and Greene JA. *The Decline and Rise of Coronary Heart Disease. American Journal of Public Health* [Internet]. 2013 [cited 2019 March 30]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3682614/pdf/AJPH.2013.301226.pdf

2. *Cardiovascular Disease: A Costly Burden for America* [Internet]. 2017 [cited 2019 March 30]. Available from: https://www.heart.org/-/media/files/get-involved/advocacy/burden-report-consumer-report.pdf?la=en&hash=0A2A75E9FE82F7BEAE6A6A0FDB64E3FCE2BD8669.

3. Heart Disease [Internet]. 2017 Nov 28 [cited 2019 March 30]. Available from https://www.cdc.gov/heartdisease/facts.htm

4. Heart Disease & Stroke Scorecard [Internet]. Available from http://www.healthvermont.gov/scorecard-heart-disease-stroke

5. Interactive Atlas of Heart Disease and Stroke [Internet]. Available from https://nccd.cdc.gov/DHDSPAtlas/Reports.aspx

6. Prevalence of Heart Disease–United States, 2005 [Internet]. 2007 Feb 16 [cited 2019 March 31]. Available from https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5606a2.htm

7. 1305 Surveillance: State Public Health Actions to Prevent and Control Diabetes, Heart Disease, Obesity and Associated Risk Factors and Promote School Health [Internet]. 2017 Jun [cited 2019 Mar 31]. Available from http://www.healthvermont.gov/sites/default/files/documents/pdf/HS_1305_Data_Pages_081816.pdf

8. Hennekens CH. Overview of primary prevention of coronary heart disease and stroke UpToDate [Internet]. [updated 2018 Nov 27; cited 2019 Mar 30]. Available from: https://www-uptodate-com.ezp.med.uvm.edu/contents/overview-of-primary-prevention-of-coronary-heart-disease-and-stroke?search=CAD&source=search_result&selectedTitle=3~150&usage_type=default&display_rank=3

9. Artinian NT , Fletcher GF, Mozaffarian D, Kris-Etherton P, Van Horn L, Lichtenstein AH, Kumanyika S, Kraus WE, Fleg JL, Redeker NS, Meininger JC, Banks J, Stuart-Shor EM, Fletcher BJ, Miller TD, Hughes S, Braun LT, Kopin LA, Berra K, Hayman LL, Ewing LJ, Ades PA, Durstine JL, Houston-Miller N, Burke LE. Interventions to Promote Physical Activity and Dietary Lifestyle Changes for Cardiovascular Risk Factor Reduction in Adults [Internet]. 2010 July 27 [cited 2019 Mar 31]. 122(4). Available from https://www.ahajournals.org/doi/full/10.1161/cir.0b013e3181e8edf1.

10. Wilson PWF and Douglas PS. Epidemiology of coronary heart disease UpToDate [Internet]. 2018 Aug 30 [cited 2019 Mar 30]. Available from: https://www-uptodate-com.ezp.med.uvm.edu/contents/epidemiology-of-coronary-heart-disease?search=coronary%20artery%20disease&source=search_result&selectedTitle=2~150&usage_type=default&display_rank=2

# Interview Consent Form

**Written Project:**

Students are required to submit a 10-slide PowerPoint summarizing their community project at the end of their clerkship. The titles of the slides are pre-set, please see #4. The first nine slides should summarize the community project and should be uploaded to ScholarWorks separately from page 10.

Slide 10 will state the following:

**Thank you for agreeing to be interviewed. This project is a requirement for the Family Medicine clerkship. It will be stored on the Dana Library ScholarWorks website. Your name will be attached to your interview and you may be cited directly or indirectly in subsequent unpublished or published work. The interviewer affirms that he/she has explained the nature and purpose of this project. The interviewee affirms that he/she has consented to this interview.**

**Consented __X__**

**Name: _____Dr. Joe Haddock_____**

**Name: _____(patient)_____**

**Did NOT Consent_____**

**Name: _____**

**Name: _____**